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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/767,167

01/30/2004

Akira Miura

042054

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EXAMINER

REAMES, MATTHEW L

ART UNIT

PAPER NUMBER

2891

MAIL DATE

DELIVERY MODE

11/14/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/767,167

Applicant(s)

MIURA ET AL.

Examiner

Matthew L. Reames

Art Unit

2891

**- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 August 2007.  
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-11 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_  
 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_  
 5) ☐ Notice of Informal Patent Application  
 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1,2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over by IBM Technical disclosure (NB8910242) in view of Sugino (Applicant's Admitted Prior Art) as evidenced by Mandelman (US 5629580).

- a. As to claim 1 and 2, NB8910242 teaches the use of a gated field emission devices (FEDs) in an integrated circuit instead of FETs (see disclosure). Mandelman clarifies that FEDs are indeed fine vacuum tubes (see column 1 lines 10-25). The IBM technical disclosure does not teach a semiconductor substrate.

Sugino teaches forming such device on a silicon (semiconductor) substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the devices of IBM technical disclosure integrated circuit on a silicon substrate or to form FEDs in conjunction with integrated circuit on silicon substrates.

One would have been so motivated for faster switching speed of a FED.

b. As to claim 7, NB8910242 teaches a thermionic cathode.

3. Claims 3-6,8,9,10,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peczalski (US 4991920) in view of (NB 8910242)/Sugino in further view of Mandelman.

a. As to claim 3-6, Peczalski teaches a A/D converter using a Mach-Zender interferometer (see column 3 lines 50-70). Peczalski further teaches amplifier which will use transistors (see item 86). Examiner is interpreting the device of Peczalski to be a high speed communication device, since information is contained in the light, as well as electric field sensor since it detects light. Further Peczalski teaches laser (solid state devices) (see e.g. figs. and column 2 last paragraph).

It would have been obvious to one of ordinary skill in the art to have replace the FETs of Peczalski with the FEDs of (NB 8910242).

One would have been so motivated in order to have faster switching speed and radiation insensitivity as taught by Mandelman (see column 1 lines 10-25).

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over NB (8910242)/Sugino as applied to claim 7 above, and further in view of Dai et al. (US 20010019238).

a. As to claim 8, neither NB8910242 nor Peczalski teach the use of a carbon nanotube.

However carbon nanotube FEDs were well known in the art, further carbon nanotubes can be mass produced (see Dai abstract).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a carbon nanotube gated FED.

One would have been so motivated since they were standard in the art would have provided a cost benefit.

5. Claims 3-6,8,9,10,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soref (US 5,838,870) in view of (NB 8910242)/Sugino in further view of Mandelman.

a. As to claim 3-6,9,10,11 Soref teaches a A/D converter using a Mach-Zender interferometer (see column 3). Soref further teaches FET (see column 4). Examiner is interpreting the device of Soref to be a high speed communication device, since information is contained in the light, as well as electric field sensor since it detects light. Further Soref teaches laser (solid state devices) (see e.g. figs.).

It would have been obvious to one of ordinary skill in the art to have replace the FETs of Soref with the FEDs of (NB 8910242) on the silicon substrate of Soref.

One would have been so motivated in order to have faster switching speed and radiation insensitivity as taught by Mandelman (see column 1 lines 10-25).

***Response to Arguments***

6. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew L. Reames whose telephone number is (571)272-2408. The examiner can normally be reached on M-Th 6:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. William Baumeister can be reached on (571)272-1722. The fax phone


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Art Unit: 2891

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MLR

  
Matthew C. Landau  
Primary Examiner